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ABSTRACT

Success may be conceptualized within five major domains: academic, aesthetic, social, physical, and moral. The five domains may be further considered either within an individual or a societal dimension, depending on which party principally benefits. Finally, success can be further subdivided into two models; one being competitive, which is termed "zero-sum," and one noncompetitive, termed "additive." An example of the zero-sum model is the attainment of a place in a professional school (e.g., medical school), where success for one individual entails failure for another. An example of the additive model is the successful playing of a musical instrument, where the success for one person implies no loss for another. Every domain can be subdivided into four, varying by dimension, individual or societal, and by zero-sum or additive model. Most research tends to be in the academic and social domains, and is concerned with individual benefits according to zero-sum assumptions. Thus, although school effectiveness studies are concerned nominally with academic achievement, interest in that achievement is predicated on its relationship with success in postsecondary institutions, and, ultimately, with future social status, employment, and income. There is little research on the persistence of academic gains in later life. Research is particularly abundant on the relationship between success in school and success in postsecondary institutions and employment. Aesthetic, moral, and physical success are not widely researched. (Author/BZ)

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MODELS OF THE RELATIONSHIP BETWEEN STUDENTS' ACHIEVEMENTS IN SCHOOL AND LATER SUCCESS

MARK HOLMES, Principal Investigator

This research project was funded under contract by the Ministry of Education, Ontario.

This study reflects the views of the authors and not necessarily those of the Ministry of Education.

The Honourable Sean Conway, Minister

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ABSTRACT

Success may be conceptualized within five major domains: academic, aesthetic, social, physical and moral. The five domains may be further considered either within an individual or a societal dimension, depending on which party principally benefits. Finally, success can be further subdivided into two models; one being competitive, which is termed zero-sum, and one noncompetitive, termed additive. An example of the zero-sum model is the attainment of a place in a professional school (e.g., medical school), where success for one individual entails failure for another. An example of the additive model is the successful playing of a musical instrument, where the success for one person implies no loss for another. Every domain can be subdivided into four, varying by dimension, individual or societal, and by zero-sum or additive model.

Most research tends to be in the academic and social domains. Most is concerned with individual benefits according to zero-sum assumptions. Thus, although school effectiveness studies are concerned nominally with academic achievement, interest in that achievement is predicated on its relationship with success in postsecondary institutions and, ultimately, with future social status, employment and income. There is little research on the persistence of academic gains in later life.

Research is particularly abundant on the relationship between success in school and success in postsecondary institutions and in employment. It is not entirely clear (1) how much the school is a conduit for the passage of social advantage, and disadvantage, from generation to generation, (2) how much the school acts to certify intellectual skills and traits of personality developed mainly outside school, (3) how much the school actually serves to provide, on the basis of a measure of equal opportunity, a variety of skills and aptitudes required for future success.

Aesthetic, moral and physical success are not widely researched. However, there is some evidence that an intense, directed, residential experience influences both aesthetic development and values. Some of this influence is persistent. A problem for democratic society is that these findings imply the prior selection of those values to be inculcated.

Most of the research is American. Canadian data are notably lacking in the following areas: research into those characteristics of successful schools which differentiate them from less successful schools; and research in the aesthetic, physical and moral domains. Ontario research in the academic and social domains, using the individual as unit of analysis and zero-sum assumptions, replicates American findings. A longitudinal study, examining all five domains, beginning with children entering first grade, would be a major contribution to the existing literature. Very little is known about the effects of experimentally creating the characteristics associated with successful schools. Finally, comparatively little has been done to follow-up individuals in later life in order to assess the influence on them of their schooling, or to identify successful individuals and trace the origins of their success.

INTRODUCTION

In Canada, virtually every young person goes to school. Almost all of those few who do not go to school do receive an alternative "schooling" at home. Most young people receive twelve years or more of elementary and secondary schooling in a formal setting. A significant proportion receives postsecondary schooling in college or university. It is a matter of some importance to determine in what ways young people are changed as a consequence of their schooling. There are several conceptual possibilities.

First, young people, or some young people, may be no different as a consequence of schooling. It is conceptually possible, if unlikely, that they would be exactly the same at age 25, with or without schooling. Even this rather extreme position may be somewhat less extreme than it at first appears. The position is not that the 25 year old is indistinguishable from the five year old - that assertion would be patently ridiculous. Equally, the position is not that nothing happened during the hours of schooling. That, too, would be patently ridiculous. Children do have experiences in school: some children learn to read; some children enjoy King Lear; some children learn to dislike other persons different from them; and so on. Rather, this conceptual position is that the experiences of school, taken for a population or sample of a population, are not unique, that changes attributable to school are slight and that, in any case, they would have taken place without schooling, partly as a result of maturation and partly as a result of family and community upbringing.

Second, it may be accepted that there are clearly identifiable outcomes of schooling that would not be entirely reproducible without such an institution. However, these outcomes may be seen as being merely reflections of the family input. Thus, schooling becomes an agent for the family. Those who ask much, receive much. Those who ask little, and do not know how to ask for more, receive little.

Third, schooling may have an effect on some or all young people partially or entirely independent of the attributes they bring with them from home. An example of such an effect might be physical fitness. It is conceptually possible that most children become fitter as a result of attending school. According to that hypothesis, children identical to those attending school, who do not attend school, are less fit; and home background does not affect the level of fitness achieved. An example of a partially independent effect follows. Suppose we were to find that students who attend certain colleges and universities become less dogmatic and less authoritarian. However, we might find that attendance at such schools is predicted by such variables as parents' liberal attitudes, parents' education, parents' occupation and parents' income. Thus the influence may be only partially independent. Some schools have the effect and others do not, but home factors help determine who may be influenced and whether the effect will actually take.

The first concept is incompatible with the second and third concepts with respect to a specific population of students. However, the second and third concepts are quite compatible with each other. Further, it is perfectly possible that schooling has no influence in certain domains, but has major influence in other domains.

My purpose here then is to examine the three conceptual claims. (1) Schooling brings about no changes that would not result without schooling. (2) Schooling brings about change, but its role is basically one of mediation, one of a proxy for external environmental influence. (3) Schooling has significant short and long term influence.

SCHOOLING & SUCCESS: THE PROBLEM

The Nature of Success

(1) Individualistic Success

Success may be defined within five domains: academic achievement; aesthetic development-including appreciation and expression in music, art, literature, dance and drama; physical achievement-including fitness, ability in sports and psychomotor dexterity; social achievement-including leadership, citizenship, occupational and financial success; and moral development-including the happy life in the classical sense, i.e., the good life which has been lived in terms of a coherent set of desirable values. Those criteria of success can be conceptually operationalized by examining the lives of individual human beings.

(2) Collective Success

Following the definition provided above, we could, presumably, with complete knowledge, tot up a score card for all those who have experienced schooling. We could measure their lives in the various domains and give them a score in each one. Of course, some of the domains would have major subdomains, but the principle is clear. We would probably have disagreements about what distinguishes aesthetic from moral success, but again, those disagreements settled, the principle would be clear. Therein lies an important assumption. The products of schooling are individual benefits. That is a utilitarian assumption. It will not be surprising if research tends to dwell on selected individual benefits, i.e., does more schooling produce higher salaries, better jobs, less unemployment?

A less materialistic and less individualistic view of success would not consider employment, promotion, and income as facets of personal fulfilment. Instead, it would

conceptualize success in terms of individuals' contributions to the welfare of the community. The intrinsic value of the classical happy life would be more important than measures of individual income and successful employment.

An extrapolation of that view is to consider more specifically whether schooling benefits society as distinct from the individual. Is the benefit to society more than the sum of benefits to the individuals of which it is made up? By changing the unit of analysis from the individual to the society, success can be interpreted in terms of the nature of society, considered both qualitatively and quantitatively. Some will argue that society is no more than the sum of its individual members. However, even with that assumption, it would still be possible to use society, rather than individual persons, as the unit of analysis.

Zero-sum or Additive Model of Success

When considering the success of individuals following schooling, it is valuable to conceptualize that success in relative or absolute terms. Is life a game that everyone can win or does someone winning imply someone else losing? Consider a society with completely static employment opportunities, i.e., jobs become available only in case of retirement or death of an incumbent. Imagine that society has a high degree of equality of educational opportunity, i.e., jobs are allocated according to legitimate educational credentials for which there is a high level of open competition. It follows that any success is relative. If there are 200 openings this year in medical school and 1000 applicants, winning does imply losing. I call this a zero-sum model of opportunity.

In contrast, imagine a society where there is enormous economic growth, where there are no regulations limiting the growth of occupations and where there is no hindrance to qualifying for a particular type of employment. In such a society, upward social mobility is entirely absorbed by changes in demand. I refer to this as the additive model of opportunity.

The distinction at first may appear to be unhelpful. For one thing, no modern society is likely to fit either the zero-sum model or the additive model exactly. No society is completely static, none is infinitely expandable.

However, the conceptual distinction is an important one to bear in mind as one considers the success of the educated and the uneducated. Contemporary Canadian society, it is safe to say, does contain some elements of the zero-sum model. If we double the number of air pilots, it is unlikely that the number of commercial flights will double as a result. Even in areas like law, medicine, dentistry and teaching, there seem to be limits to the increase in employment opportunities. The implication is important: in a zero-sum society, the economic gains and many of the psychic gains from schooling are not only individual, but are allocated from an almost fixed supply. I say "almost fixed" because increased gains in productivity might exist within a comparatively static society. Still, even if there are some overall incremental, societal economic gains within a static society, it is arguable that much of the success of social advancement is relative. That is to say, perhaps the rich person (in the 99th percentile by income) in India is as happy, and successful, as the equivalent in the U.S.A., even though the material wealth of the former may be only a fraction of that of the latter. I am leading here, of course, to the point that schooling in contemporary western society serves as a distributive mechanism for many of society's symbols of success. The extent to which schooling serves to increase the total amount of success, or happiness, is an entirely different and more open question. In a zero-sum society, there is a fixed supply of "goodies" and schooling serves as the distributive mechanism for sharing them fairly. In an additive society, schooling not only serves as a distributive mechanism but augments the supply of "goodies". Both mechanisms are at work in contemporary western societies.

Table 1 shows the five domains of success: academic, aesthetic, social, physical and moral. The system is a taxonomy; it is not a theory of success. Thus, all conceptions of success can be classified within the system. The system is to be judged in terms of its utility rather than its truth. Similarly, the categorization of society/individual dimensions is intended to serve as a reminder of the two aspects of success. It is not suggested that success falls naturally into two separate, discrete dimensions. Thus, political leaders certainly demonstrate personal, individual success; they may also provide societal success.

Both dimensions can, conceptually, be examined either objectively from an amoral viewpoint or subjectively from a moral viewpoint. Over the short term of five years both Hitler and Roosevelt,in their different ways, were objectively successful. They produced change in their respective societies. Subjectively, there is clear consensus that Hitler's changes, both in the short term and in the long term, were bad, and therefore unsuccessful in

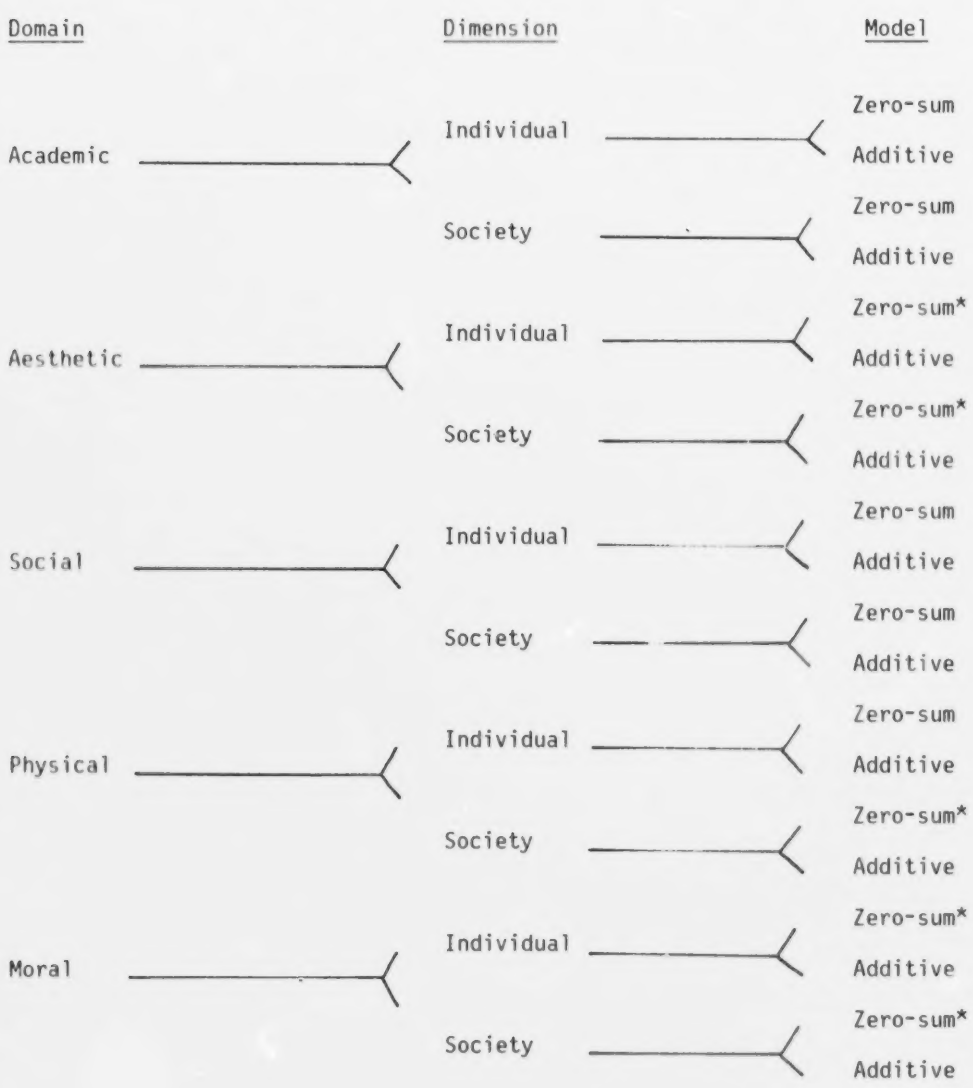
common parlance. A statement from one of his relatives that, "I always knew Hitler would be a success", would not receive a sympathetic hearing today. In the case of Roosevelt, there is less consensus. Some have questioned the degree of change he actually brought about. In addition there would be sharp subjective disagreement between liberals and conservatives as to whether his influence, powerful or not so powerful, actually constitutes success. This distinction is not a trivial one that can be easily brushed aside. It cannot even be placed into the difficult moral domain and classified as too difficult to handle. The example I have given falls clearly in the social domain. The same principle applies to all five domains, to a greater or lesser extent. The inventions (1) the atomic bomb, (2) weapons of germ warfare, (3) new techniques for abortion and birth control, (4) new management techniques to manipulate workers, (5) new communicative technologies to sell increased quantities of merchandise of questionable worth, all constitute, objectively, academic success. But not everyone would be happy with the word success in those contexts. Breakthroughs in the arts-the twelve tone system in music, kinetic art, stream of consciousness writing-are all major objective successes, but are not universally approved.

It is important not to undervalue the significance of this point. Much of the research concerns itself with the effect of schooling on future economic success. Clearly, that research is of no great interest to those who believe that schooling should not be concerned centrally with the distribution of economic inequality. That last view may represent only a small minority. The problem becomes much greater when one turns to the influence of schooling on attitudes, values and religion. Put more simply then, research on the most easily operationalized conceptions of success may be misleading, even harmful.

Table 1 provides twenty conceptual models of success. Some are of greater interest than others. The zero-sum models are of greater interest in the academic and social domains. Here there tend to be limits on the rewards that can be distributed. Not every student will gain a place in the University of Toronto. Not every aspiring politician will become Prime Minister. In some areas, more failure than success is inevitable. In the aesthetic area, the zero-sum model has much less applicability. While it is true that not everyone can become a concert pianist or a famous playwright, the demand for concerts and entertaining plays is much more elastic than the demand for dentists. That is to say, if there are more entertaining plays, it is likely there will be increased attendance at the theatre. In contrast, increasing the supply of dentists may not necessarily or even probably increase the supply of caries.

Table 1

SUCCESS



*of little or no significance

Table 2 provides examples of criteria for success that could be used in fifteen of the twenty models. The zero-sum models have been omitted in the case of individual success in the aesthetic and moral domains. In the moral domain, it would appear to be a null set. One might argue that becoming Pope or Anglican Primate of Canada is a zero-sum criterion. However, that might better fit the social domain as moral fitness is presumably not the attribute which most clearly distinguishes success in the church hierarchy from those less successful beings who work in more humble stations. Mother Teresa is not necessarily less morally successful than Pope John Paul. In the aesthetic domain, there are some limitations on the number of concert pianists and opera singers Canada and the world can absorb. Even so, the zero-sum model seems generally inappropriate. The zero-sum models have also been omitted in the case of societal success in the aesthetic, moral and physical domains. It would appear to be theoretically if not conceptually perverse to set a societal criterion in these domains based on a fixed limitation of available opportunities for success. It may be reasonably argued that societal success in these domains requires a reasonable balance of aesthetic, moral and physical achievement, and that extreme educational emphasis in any one domain would be undesirable. However, such a criterion of balanced success still fits the additive rather than the zero-sum model. One might picture a goal of the neo-Renaissance educated person-academically aware, aesthetically appreciative and skilled, socially contributing, physically fit and skilled and, in the moral domain, good and happy. That ideal is quite contrary to the zero-sum model-the closer everyone reaches the ideal the better, and the success of one in no way denies entry to success to another.

Thus, although there are twenty conceptual models of success, only fifteen appear to be worth serious study, and they vary in importance. Most people, if asked to consider the relationship between schooling and future success, would probably think initially of what I have classified as academic and social success. These two themselves are closely related. Many young people, and their parents, have quite utilitarian views of education. Success in high school, measured in terms of academic grades, is considered important precisely because it provides opportunity for success (measured in terms of employment and income) in later life. To this extent, academic success can be seen as an intervening variable between home background and schooling on the one hand and social success on the other. The physical domain is probably the least appreciated category of success, perhaps because the school is perceived to have little effect in this domain. The moral domain is often considered to be of great importance by educators, social commentators and parents alike, but the criteria of success

are likely to be disparate. Most crucially, there tends to be a division between those who define moral success in terms of believing in and living certain moral virtues and those who define it more in terms of an openness of attitude to a wide variety of moral positions. The aesthetic domain is very highly valued by some, scarcely considered at all by others. In short, it will not be surprising to the reader to find that research tends to emphasize the academic and social domains.

Table 2

EXAMPLES OF CRITERIA OF SUCCESS

Domain	Dimension	Model	Example
Academic	Individual	Zero-sum	Successful access to competitive university programs
Academic	Individual	Additive	Increased university enrolment; more knowledgeable individuals
Academic	Society	Zero-sum	Improved calibre of professional students in university programs
Academic	Society	Additive	Broader spread of knowledge and literacy in society
Aesthetic	Individual	Additive	Increased skills in music and art
Aesthetic	Society	Additive	Increased evidence of culture in society; more beautiful cities
Social	Individual	Zero-sum	Income; social status; promotion
Social	Individual	Additive	Income; social status; promotion; leadership
Social	Society	Zero-sum	Efficient, fair system of social mobility
Social	Society	Additive	Improved sense of community; more pleasant life-styles
Physical	Individual	Zero-sum	Access to top sports teams, Olympic teams
Physical	Individual	Additive	Improved physical fitness
Physical	Society	Additive	More health conscious society
Moral	Individual	Additive	Improved levels of morals and virtue
Moral	Society	Additive	Decreased crime

Schooling is interpreted for this research as including both elementary and secondary formal education in schools and postsecondary education in colleges and universities.

There are three broad ways in which the set of variables called schooling can be "operationalized". They answer the questions: how much? with what result? what kind?

The first measure is the most straightforward. It is straightforward in that it is easy to measure and in that, at least superficially, we know what it means. Sometimes it is operationalized as years of full-time schooling. One might want to discover if years of full-time schooling predict (1) level of academic achievement, (2) chances of continuing to college or (3) spelling ability in later life. Most often it is operationalized, less purely, as last year of schooling successfully completed. Here the problem of interpreting exactly what we mean by schooling becomes more apparent. Implicit in the question, "does more time in school predict better achievement or a happier marriage?" is the thought,"does more time in school produce more learning and more happiness?". The reason we are interested in relationships is that we want to know more about influence, about cause and effect. The moment we exchange years in school for last grade successfully completed, the problem becomes explicit rather than implicit. "Successful completion" differs from "unsuccessful completion". Completion of school is not just a matter of time; presumably desire, attitude, intelligence, conscientiousness, imagination, obedience, family income, parental attitude, peers' attitudes, school and community norms-to name a few of the more obvious variables-all influence the ascent of the scholastic ladder. We do not remove that problem merely by substituting years of school for level of school completed, we merely make it a little less obvious. Either way, the variable of schooling means a lot more than time exposed to formal education. To observe that one can, and that some young people do, spend a great deal of time in school without learning very much is to miss the point. The difficulty is not just that some children learn more than others from the school exposure. That is normally true in experimental studies with any living thing. Some tomatoes will grow faster than others treated with the same fertilizer. The difficulty is even more than the fact that variable years of schooling is not a variable like fertilizer which we can either provide or withhold. The difficulty goes beyond the problem of contamination of school treatment with other kinds of treatments from outside the school. The crucial difficulty is the close association with these other

variables outside the school whose influence is collinear. Put simply, it is extremely difficult to know what is learned in school, what is learned simply by growing up in western society and what is learned at home. Even worse, we do not know how much one can substitute for the others. As a rule, children with home background X tend to have schooling of variety A; and children with home background Y tend to have schooling of variety B.

The second set of schooling variables, often referred to as outcomes of schooling, is in fact very little different from the criteria described earlier within the domains of success. So, school grades, or achievement test results, are used as measures of school effectiveness to predict success in college, university or later life. The term "outcomes" may be misleading. It implies effect, and, as I have said, the effect of schooling is very difficult to separate from the effect of other variables. Consider the following hypothetical example. "Research on graduates from Lakewood Forest School, a boys' private school of high prestige situated between Kingston and Brockville, shows that the outcomes of their education include average scores over 650 on the SAT (verbal), over 670 on the SAT (non-verbal) and self-concept scores one standard deviation above the mean for high school graduates in the rest of Canada." Such a comment would elicit little surprise among researchers and might even merit a report in Maclean's. If one were to say, for example, that the outcomes included average height over 1.70 metres and male gender-a statement only slightly less sensible than the former, considerable surprise would be elicited. Outcomes then may be useful variables to represent schooling but we must be cautious about interpreting their origin.

These first two sets of variables, amount of schooling and outcomes of schooling, despite their severe lack of conceptual clarity, do have implications for policy. If we can show that years of schooling do have an independent effect on some outcomes and that the school measures of outcome are, to some extent, sensitive to the school experience, then it is important for policy makers to know exactly what more schooling will buy. At a time of scarce resources, schooling must compete with health, social welfare and industrial development. The effects, both individual and societal, of increased investment in postsecondary education, in particular, are of considerable political and strategic significance.

The third set of variables is useful for addressing a very different set of policy questions. A school may be seen as having a variety of forms of wealth at its disposal: clientele; teachers; programs-in the broader sense of the word; administrators; time;

materials. In practice, most schools are extremely limited in the way they are permitted to manipulate these variables. The clientele is often a captive audience, zoned from a prescribed neighbourhood. Educational psychologists have sometimes argued that the best education would result, if teachers could choose their own pupils, and if pupils could choose their own teachers. In many schools, the unwanted are taught by the unwilling. Administrators, particularly in times of declining enrolment, have little influence over the selection of teachers. Programs, both in terms of compulsory courses and levels and in terms of program content, are laid down from outside the school. In large bureaucratic school boards, administrators are usually hired by the same people following the same criteria. Instructional time in schools is often allocated by predetermined formulae and is limited by the capabilities of the computer. School buildings are not easily changed and learning materials are often selected from approved lists with the help of externally established and fixed budgets. It should not be surprising then if some research shows schools not to vary too much in their effects on pupils. However, such lack of variance in effectiveness should not be mistaken for lack of effectiveness. The small amount of variation among schools does not therefore mean that schools are ineffective, although they may be. It does mean that it becomes very difficult to distinguish which variables can most easily be manipulated to make schools more effective.

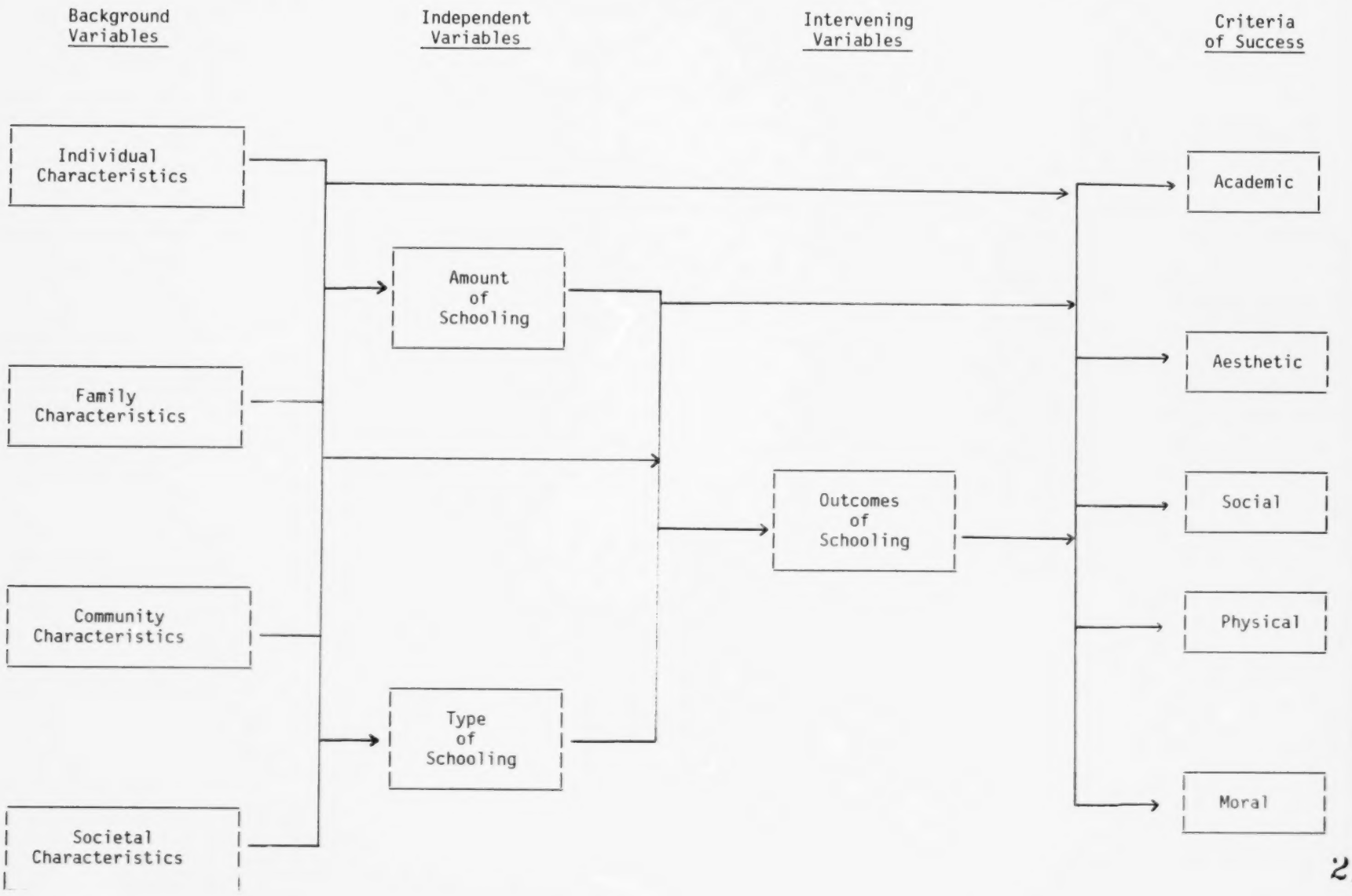
Figure 1 illustrates the conceptualization developed in this report. I have not discussed directly the external factors in whose context schools must operate. They can be divided into four: individual characteristics (intelligence and character); family characteristics (culture); community characteristics (culture and norms) and societal characteristics (economic, political and cultural). The background variables influence both the amount and the type of schooling provided. These in turn influence the outcomes of schooling, which, I have noted, are also directly influenced by the background characteristics. Further, the criteria of success in the five domains are influenced not only by the outcomes of schooling but by the background and independent variables.

Research Methodology

Research methodologies applicable to the problem of the relationship between schooling and future success are of two basic kinds. It is possible to use statistical methods to examine the association of a number of variables. By this method one can infer cause and effect. Or one can use experimental techniques and measure cause and effect more or less directly, in theory if not in practice. Alternatively, one can make written observations or record the observations and recollections of others. One can combine both methodologies by using the two simultaneously or by measuring the associations based on observations.

The empirical methodology breaks down into subcategories--one based on the comparison of proportions of respondents with different background characteristics and educational treatments achieving certain characteristics of success; the other based on relationships among a variety of independent and dependent variables, usually with one or more independent variables held constant. The second category is merely a more sophisticated version of the first.

Figure 1


Background Variables
Independent Variables
Intervening Variables
Criteria of Success
Individual Characteristics
Family Characteristics
Community Characteristics
Societal Characteristics
Amount of Schooling
Type of Schooling
Outcomes of Schooling
Academic
Aesthetic
Social
Physical
Moral

The methodology involving case studies consists of examining individuals or individual institutions and observing the apparent influence of the institution on the individual.

Either methodology can be used as a cross-sectional study or as a longitudinal study. A true longitudinal study involves a follow-up of the same individuals over time. A series of cross-sectional studies may sometimes produce the same effect, i.e., cross-sectional studies may be carried out simultaneously at a variety of age levels as a simulation of change over time. There are many possible variants of each approach.

I have already indicated some of the difficulties facing research into the relationship between schooling and future success, particularly if some inference of causality is to be drawn. Ideally, learners should be randomly distributed to different educational and non-educational treatments. Changes in the five domains would be carefully plotted over a lifetime using both empirical and observational methodologies. The ideal is itself not so much utopian as nonsensical; it would involve treating female children as though they were male, placing blacks in white families and treating the gifted as though they were not gifted. And all this would require the ignorance of the participating families and educators! Anything approaching pure experimental research is totally infeasible.

Some of the more obvious difficulties are these. First, it is generally not possible to compare schooled with non-schooled children in modern societies. Certainly, there are a few children who do not attend school in the regular way. However, they are usually anomalous in some other way-it is anomalous not to attend school. Even if research is carried out on a small population of non-schooled youngsters, any findings are likely to be uncertain. Schooling is so omnipresent in western society that one might hypothesize that societal norms of child development and behaviour are those established by schools. Thus, if one were to find that non-schooled children learn to read at the age of seven just as well as schooled children, one could not conclude that schooling does not make a difference. Perhaps the effect of schooling is so pervasive that it has become normative for children to read by that age. For example, I taught three of my children to read in English at the age of six because, for various reasons, they were not learning in school. I knew they would be required to read in second grade.

Second, it is extremely difficult to separate the effects of background from the effects of schooling. Even among the background variables, there is considerable dispute about the relative significance of essentially unchangeable factors related to genetic inheritance, neurological makeup and physical features; and of cultural factors related to family, community and upbringing. As both these sets of factors continue to operate and change through life (i.e., inherited intellectual skills grow and physical features change), their interaction with schooling is extremely difficult to establish.

Third, variations in schooling are often of short duration. An excellent teacher may teach a child for one year, perhaps two years, rarely for twelve. A child may attend a school with a climate particularly conducive to learning for six years, rarely for twelve. Occupational and geographic mobility in western society makes it unlikely that the effects of long term exposure to a particular variable can easily be established. And if they are, the impact is limited by the fact that most children in a group studied are unlikely to have been susceptible to such long term continuous influence. Thus, studies of short term effects are subject to criticisms about their relevance for the long term; studies of long term effects are likely to have great difficulty identifying long term influence in the absence of long term exposure.

Finally, and this is a development of the second difficulty, it is difficult to distinguish the so-called <u>conduit</u> effect of schooling from the intrinsic effect. This is an important concept that underlies much of the literature. The clearest example of the conduit effect is to be seen in the research on movement from school to college and university and thence to working life. It is well known that school grades and standardized test results are good predictors of success in college and university. But what substantive meaning lies beneath the relationship? One conceptual possibility is that intelligent students get good grades and also continue their education. The school is merely a conduit that puts a seal of approval on their intelligence. A second possibility is that students of the appropriate social background are conditioned by that background to obtain good grades and to continue their education. Once again, the school is a conduit. A third possibility is that the school

teaches required knowledge, habits and skills which become certified qualifications for post-secondary study. It it also possible, and likely, that all these three explanations are operating simultaneously. The task of sorting out those three strands is daunting. Furthermore, the idea of the conduit effect is less clear-cut than I have made it seem in this simple explanation. Even if the third process is operating significantly, some critics will argue that if the process affects the offspring of high social class children more than the offspring of low social class children, the school is still effectively acting as a conduit.

SOME RESEARCH QUESTIONS AND THE LITERATURE

There is no simple, satisfactory way to categorize the existing literature in such an immense field. I have chosen to use the five criteria of success, i.e., success in the academic, aesthetic, social, physical and moral domains. This leads to some awkwardness. It is not always easy to distinguish between the aesthetic and academic domains for example, or between the social and moral domains. Further, studies are not always organized according to my categorization of domain. However, this categorization has the virtue of attacking the problem at its source-the prediction of success in life. It directs one's attention to the wealth of data on some questions, the paucity on others.

It must be borne in mind that studies also vary in a number of other ways: the use of empirical or case study methodology; the use of longitudinal or cross-sectional analysis; the use of elementary and secondary or postsecondary schooling; the country of origin; the use of schooling as a composite variable or the use of schooling as a number of analytically discrete subtypes.

A Selection of Research Questions

(1) Academic Success

Does performance in school predict academic success in postsecondary schooling?-This is one of the most researched questions in the field. Consistent relationships are found between performance in school and performance in college or university, with r generally being between 0.4 and 0.6. For example, Burnham and Hewitt (1972) calculated a multiple R of 0.57 in predicting performance at Yale from school grades and achievement tests. In Ontario, Traub et al. (1977) found an r of 0.6 between grade 13 average grades and the first year university average. That coefficient is a little higher than is typically found in the U.S.A., where the

variety of both high schools and universities is greater. In general,standardized tests alone predict university performance a little less well than do school grades alone. However, a linear combination provides the best prediction. The highest predictive estimates are given by Weitzman (1982), who found a correlation of 0.64 between achievement tests and first year grades, of 0.60 for high school grades and 0.76 for the combination. In Ontario, Khan (1969) found a correlation between standardized tests and first year university grades of 0.47 and the best combination multiple R of 0.61.

To what extent is the relationship between high school and university performance causal and to what extent does it reflect the high school as a conduit for students of high social class and/or high ability to university? -This question cannot be answered definitively as the findings require careful interpretation. Generally, tests of ability predict performance in university less well. Other measures of similar reliability reflect skills more closely related to those apparently required in university. However, the varied findings and small differences are not incompatible with a conduit effect.

Loyd et al. (1980) found that tests taken in eighth grade predicted first year university grades with a correlation of 0.44; the coefficient for equivalent tests taken in twelfth grade was 0.46. Although it is possible that the tests had little relationship to the high school curriculum actually experienced, it must be borne in mind that most studies find the relationship between high school grades and university grades in the region of 0.5. Thus it can be argued that, if success in university can be as easily predicted in sixth grade as in twelfth, success in university is unlikely to be very dependent on what is actually learned in school. After all, if it is argued that good students in sixth grade are the good students in twelfth grade, one must ask why only one third of the variance in achievement can be explained.

The relationships among socioeconomic status, intelligence and success in school and university have been extremely well researched. As measured intelligence is strongly related to socioeconomic status, it is difficult to determine exactly how important each is as a contributing factor to academic success. Porter et al. (1979 and 1982) have researched this problem in Ontario and their findings are consistent with those of the U.S.A., Jencks (1972 and 1979), Sewell and Hauser (1975), Flanagan et al. (1971). With home conditions controlled, intelligence remains a significant predictor of success in school and university. This finding

does not support the idea that school is merely a conduit for the inheritance of socioeconomic status, i.e., many bright students do benefit from attending school. However, that conclusion does not contradict the earlier suggestion that performance in university is not directly and heavily dependent on what is learned in school. Another explanation of the importance of intelligence to future success is that schools identify and label some promising youngsters who thereby continue to university. They may or may not use what they have learned in school. This would be consistent with Marjoribanks' Australian study (1984) which found that parental aspirations are the strongest influences on children's aspirations. Such aspirations are related to but not entirely caused by socioeconomic conditions and intelligence. However, although the school system does serve to identify some bright children who thereby become well educated and also qualify for future social success, Porter et al. (1982) also find strong evidence of interaction between socioeconomic status and intelligence. Intelligent young people from low SES backgrounds are far less likely to continue to university than are young people of the same intelligence from high SES backgrounds. This finding is compounded by gender. Intelligent women from low SES backgrounds are even less likely to attend university than are equivalent men. At least, that was the finding in 1970.

The entire question of the school as a conduit implies that academic success is valued more as a proxy for social success than for its intrinsic value. This discussion will be taken further under the heading of Social Success, p. 29. At this point it can only be generalized that success in school is a good predictor of success in university but that we have only limited knowledge of the processes underlining that success and those relationships.

Is the relationship between schooling and academic success different in the cases of women and non-white males? -I have noted the different patterns of academic success in the case of women in Ontario. The consideration of social success will demonstrate the continuation of that pattern when we look beyond high school. In the U.S.A., academic success for blacks is either no different from that for whites or slightly superior, when either social status or intelligence is controlled. The same is true of youth of low socioeconomic status once they reach college; they do as well as high socioeconomic students with the same grades and academic aptitude, Astin (1971). It would be simplistic to argue either that race is not a problem in terms of access to postsecondary education or that social status is not a problem when students reach university. Clearly there are interrelationships among social

status, meaning family culture and ecology, race, intelligence and academic success. Even so, it would be equally naive to attribute the differences in academic success of racial minorities and women to institutional prejudice or objective barriers.

Is there a relationship between schooling and academic performance in later life? This area of investigation goes beyond the problem of predicting academic performance in college and university from academic performance in school. As more of the research is surveyed, it will become increasingly evident that one of the safest generalizations about relationships between school activity and future success is the following truism. The best predictor of a reliable measure of a future behaviour is a reliable measure of the most similar past behaviour. There is no surprise then that marks provided by teachers of high school mathematics are good predictors of marks provided by teachers of university mathematics, once some allowance is made for the inherent unreliability of any single set. Once the generalization is put in that form the problem of causation becomes apparent. A measure of general intelligence (whatever intelligence may be) taken at age twelve is a good predictor of general intelligence at age fourteen. However, there is no particular reason to believe that the processes, educational or otherwise, leading up to the earlier test are, in any way, causes of the score at age fourteen. Most likely, the scores at both ages result from a combination of three factors, in descending order of magnitude: (1) inherited intellectual/neurological capability; (2) continuing post-natal environmental experiences, both physical and mental; (3) pre-natal experience. The relationship between results of mathematical performance tests at ages eighteen and twenty is not exactly analogous with the results of intelligence tests at ages twelve and fourteen. Probably, mathematical instruction and prescribed learning activities are more influential at the later age than general intellectual activities were at the earlier age. If this hypothesis is correct (and most teachers implicitly accept it), we would anticipate that absence of mathematical instruction between the years of ages eighteen and twenty would have a greater effect on mathematical performance at age twenty than absence of schooling and similar intellectual activities between the ages of twelve and fourteen would have on a measure of intelligence taken at age fourteen.

Thus the assumptions and purposes lying behind different types of investigation of relationship may be different. We are interested in the relationship between mathematical achievement in school and in university for two fundamental reasons. We want to be able to

choose students for university whom university teachers will consider the most able. We also want to develop a selection system, for university programs with limited accessibility, that is most fair to the contestants. Thus fairness is of utmost importance because selection for many programs (medicine and law are good examples) leads not only to a highly favoured career but to membership of a small social and financial elite.

In contrast, a very different assumption has traditionally lain behind tests of intelligence at ages twelve and fourteen. The assumption has been that intelligence, given reasonable social stability, is itself fairly stable. Thus intellectual development in a variety of pedagogical areas can be measured against a measuring rod of intellectual capacity, changes of which can be predicted through normal patterns of growth. (It is true, of course, that some researchers today assume that measures of intelligence function much more like measures of achievement in mathematics than was traditionally assumed to be the case-but that is not relevant to the point at issue here.)

The assumption behind the research question posed here is quite different from both those sets of assumptions just described. The assumption here is one of cause and effect. The reason one would be interested in a relationship between schooling and academic performance in future life is simply that one wishes to know whether more schooling directly brings about a more highly educated populace. Thus, a hypothetical finding that senior citizens with university degrees read more, spell better, compute better and have a better understanding of their society than those senior citizens without a university degree would be interesting, providing that it could be attributed directly to the effect of school. If, on the other hand, one were to find that those of the same social background and intelligence who had not attended university were equally competent, the simple finding that university graduates read more would be quite uninteresting. This question takes us from the zero-sum, distributive model of society, within which we are concerned with a fair distribution of the "goodies" society has to offer, to an additive model of society, within which we are interested in the idea that schooling has an intrinsic educational value.

Hyman, Wright and Reed (1975) surveyed the existing literature on this topic and concluded from American and Canadian evidence that schooling does indeed have a lasting value. However, there are two important weaknesses in the evidence they bring together. First, it is mainly based on factual knowledge of history, current affairs and spelling. These superficial

characteristics are not necessarily closely related to more fundamental intellectual properties of greater value. Second, with one important Canadian exception, most of the research reviewed is based on a simple comparison of more schooled and less schooled samples of the population without adequate controls either for social background or intelligence.

It may seem to be obvious that schooling, elementary, secondary and post-secondary, does teach something. Literacy is rare in societies without schools. Graduates in engineering know more about engineering than those of us who did not graduate in engineering. And so on. One of the difficulties in researching the larger and more general effects, such as understanding of literature, science and mathematics, is the very fact that we live in a highly schooled society. This means that there are usually strong intellectual, pedagogical or social impediments in the lives of those who have not received twelve years of schooling. It is difficult to control for social status and intelligence when, increasingly, those of average or high social status and intelligence receive sufficient schooling. Any sample of unschooled 25 year old adults of high intelligence and high social status would be a very peculiar sample.

Do different types of school and secondary school experience influence academic achievement? -One of the most researched aspects of the field is the way in which schools differ in their cognitive impact on learners. Coleman (1966) conducted the first major research in the field and concluded that differences in school conditions make only a very small contribution to the differences in academic achievement among learners in elementary and secondary school. However, quite apart from significant methodological problems in the research, the conclusion is open to question on two substantive grounds. First, Coleman used verbal ability as his criterion of academic achievement. Some critics argue that verbal ability is a measure of intelligence more than it is a measure of school learning. Others argue that, in any case, it is not the object of most school instruction. Second, Coleman concentrated on such easily measurable school conditions as teacher experience and qualifications, school libraries and laboratories, school size and study body composition. Critics argue that it is less the physical manifestations of the school that make a difference, more the social climatic differences; less the facilities, more the way learners are treated. Subsequently, Coleman himself (1982) came to quite different conclusions. He compared private and Catholic schools favorably with public schools, reaching the conclusion that the former schools treat students in a more demanding manner and hence obtain higher

average standards with a lower variation in standards. This conclusion is at least as controversial as his previous one. One of the reasons for contention is the same--his use of verbal ability as the criterion of school effectiveness. The other is the questionable validity of his claim that he was able to equalize, for comparison purposes, the home background effects of private/Catholic and public school pupils. It is argued that the very act of selection of a private or a Catholic school indicates a difference in the home.

Useful summaries of the research on effective schools are by Bridge, Judd and Moock (1979), Holmes (1978 and 1982), and Purkey and Smith (1983). The single most influential study is the British study Fifteen Thousand Hours (Rutter et al., 1979). Before summarizing the major findings, it is worth emphasizing a few methodological issues. First, the research has taken place mainly in western, English speaking settings, most often in the U.S.A., thus care must be taken in generalizing the findings to different settings. Second, findings have been frequently misinterpreted--as though they were providing negative answers to the question: Does schooling make a difference? The question actually addressed in these studies is a very different one from that: Do different school characteristics make a difference? Third, the criterion of academic achievement is usually defined in terms of standardized test results in North America, examination results in Britain. Fourth, insofar as countries are successful in equalizing educational opportunity, differences among schools would be neither anticipated nor desired. Fifth, it is generally conceded that intelligence and environmental culture are the major influences on individual student achievement. It is not surprising then if lesser school effects are sometimes washed out. Sixth, students typically experience different kinds of instruction and different types of school--so a concentrated influence is not to be expected. Seventh, population mobility makes it difficult to discern local influences. It is rather like looking for the effect of the local ecology on a flock of migrating ducks. These comments imply explanations for there not being a differential effect. They also explain why, whatever effect there is, is extremely difficult to measure.

I shall turn here to a brief summary of findings on school effects.

(a) Physical Facilities. There is no evidence that physical facilities, in themselves, influence academic achievement, Coleman (1966), Rutter et al. (1979), Bridge, Judd and Moock (1979). However, schools in better neighbourhoods with more successful students also tend to have better facilities.

(b) Teaching Staff. The fact that the characteristics of school staffs tend to have little relationship with academic outcomes should not be confused with the proposition that individual teachers do not vary much in their instructional effectiveness. The first proposition appears to be true, the second false-but outside the realm of this study. Experience, after the first few years, tends not to be related to outcomes, Purves and Levine (1975). Teachers with higher verbal abilities tend to be more successful with younger children, Coleman (1966), Summers and Wolfe (1975). Teachers from better universities or with better academic backgrounds tend to be more successful with older children, Purves and Levine (1975), Summers and Wolfe (1975).

(c) Class Size. The safest conclusion from very inconclusive research is that class size only makes a different at the extremes -below fifteen and over 35 pupils per class. Even then, classes of such extremes are so unusual as to raise methodological problems in interpreting the research, Educational Research Service (1980).

(d) Instructional Time. Instructional time appears to be a potent variable to the extent that: a new skill or idea is being taught; the instructional content is not regularly learned outside school; there is a clear sequence of learning. Thus time is probably closely related to achievement in second languages, mathematics, and in such skill subjects as musical expression and typing, but not in history and senior English, Holmes (1979).

(e) Instructional Methodology. There is prevailing evidence that whole class instruction, as distinct from individual or group instruction, and direct instruction, as distinct from informal instruction, tend to be most effective, Gatheral (1979), Cooley and Leinhardt (1980). Bloom (1976) claims that mastery learning techniques raise average achievement and reduce variations in achievement among pupils. The former claim is better documented than the latter, and both claims appear to be supported more in the basic skills than in advanced subject matter.

(f) Pupil Context. The context of students of high social class is another controversial area. There seems to be evidence that, in some cases, attending a school with students of higher social status than oneself, or of the same high social status, is beneficial, Coleman (1966).

(g) School Climate. The effective school studies describe a set of characteristics which is generally related to high academic achievement, with pupil background controlled. These characteristics are: high expectations on the part of teachers and students; frequent and rapid reward systems for outstanding and desired behaviour; regular assignment and checking of homework; clear, consistent patterns of discipline and use of universalistic sanctions; moderately tight control of teacher behaviour; regular monitoring of student achievement, Rutter et al. (1979), Purkey and Smith (1983), Brookover and Lezotte (1979), McDill and Rigsby (1973), Coleman (1982).

(h) School Leadership. Early research in school climate Gross and Herriott (1965), Halpin (1966), unsuccessfully sought to establish leadership characteristics related to effective schools. One of the reasons for the lack of success may lie in the assumptions that "good" leadership is that which most involves teachers in decision making and which produces the most positive relationship between principal and teachers. Both of these factors may in fact inhibit change and slow decision making. More recent studies suggest that some tension between principal and teachers may be healthy provided that the principal is seen to be leading, sincerely and professionally, towards student academic growth Rutter et al. (1979), Brookover and Lezotte (1979). More recently still, case studies of successful principals, Lightfoot (1983) suggest that the principal's personal style is far less important than high visibility, a strong sense of direction, combined with support for subordinates and a feeling of authenticity. No conclusive generalizations can be made about this factor.

No attempt will be made here to analyze and interpret this large and complex field of study. However, promising findings have been made. Despite the inevitable methodological problems in most studies of this kind, some consistent patterns of relationship have emerged. No explanation other than cause and effect has been brought forward, as yet, to explain the strong relationship between school climate factors and school effectiveness. On the other hand, there is no consistent research to demonstrate that planned change can intentionally raise the climate level of schools and produce desired improvements in academic achievement.

(2) Aesthetic Success

Does performance in school predict future aesthetic success?--This tends to be a comparatively little researched area, but the answer would appear to be positive. Bloom

(1982), for example, provides evidence that the most talented individuals owe more to their upbringing than to native talent. Schooling tends to be an important part of that upbringing in the case of musicians and dancers, perhaps less so in the case of painters, sculptors and actors.

This question verges on the social domain, as artistic success, at least in one's lifetime, is usually defined in monetary and social terms. It would be anomalous, if not contradictory, to talk of a hugely successful musician who could not draw an audience; even more so, to describe as successful a painter who could not find buyers. In that context, I foreshadow here a problem that must be faced again when I turn to the social domain. If it is accepted that there is some relationship between schooling and aesthetic success, is schooling a general prerequisite for success? Is it merely a conduit?

If the term schooling is extended to include specific training including tutoring of practising artists, then there can be little dispute that schooling is indeed a prerequisite. However, some critics may still argue, from Bloom's data on the highly talented, that the drive for success comes from the determination of the home. Just as Marjoribanks suggested that academic aspirations are born in the home, so are aesthetic aspirations. One may speculate that high aspirations do not always lead to success, that there is some combination of aspiration and ability necessary. It seems likely that there could be two, three or ten times as many first-class pianists as there are, just as there could be two, three or ten times as many first-class honours graduates in mathematics--but the pool of available talent is still not infinite. Even Bloom might admit that he could not turn any and every child into a first-class pianist, or a first-rate mathematician.

Do university graduates demonstrate more aesthetic appreciation and interest as a result of their university experience?--While it is difficult to assess the effect of the elementary and secondary school, it should be somewhat less difficult to assess the effect of postsecondary experience. Postsecondary institutions differ greatly among themselves. More important, as large numbers of young people do not receive postsecondary schooling, comparisons among the schooled and unschooled should be possible. Furthermore, as those attending these institutions are older and are often in residence, there is likely to be less continuing contamination from the influence of the home culture.

Two of the most complete studies of the influence of the university environment are those by Feldman and Newcomb (1969) and Freedman (1967). Feldman and Newcomb provide a summary of the field as well as a report on their own research. Freedman describes longitudinal research at Vassar College. Both will be discussed further under the moral domain as it is attitudes and values to which both studies give most attention. However, in the aesthetic domain, their findings are not reassuring. There is agreement that the effect of college is greatest where the experience is most concentrated and most intense--in small, elite, liberal arts universities. Even in these situations, the increased aesthetic interest noted at the end of university life is found to reverse itself five years later. Thus, although university graduates are likely to be more interested in the arts than nongraduates, it is possible that this results more from the home circumstances than from university experiences. Spaeth and Greeley (1970) support this, finding little relationship between college quality and cultural involvement. Gender and type of career choice have more independent effect on interest in reading and the arts than the type of college.

(3) Social Success

I suggested earlier that much of the research in the academic domain is effectively using academic success as a proxy for social success. Access to university, and in particular to professional programs of high prestige, is valued less for the intrinsic educational value than for the employment to which it leads. That job may itself be valued for a number of reasons: high income, professional freedom, high social status, opportunity to serve the community, and opportunity to serve one's fellows. Whatever the motive, it is more likely to fall in the social rather than the academic domain. Insofar as the motives are nonmaterial in nature, they come closer to the moral than to the academic domain. Thus the desire to cure sickness and help one's fellow man may be just as high a motive as intrinsic interest in medicine and disease. It should not be surprising then to find that research following students from school and university to later life dwells on social and moral success more than academic, aesthetic or physical success.

Does schooling predict future employment income?--In the simplest terms, schooling does provide credentials that are required for employment and income. There is a clear relationship in all studies between amount and type of schooling and employment and income. Recent Canadian evidence is to be found in a major study by Clark and Zsigmond (1981). There

remains clear evidence of differences between male and female. The differences are of two kinds. First, females still follow different patterns of training and schooling. Medicine, dentistry and engineering remain predominantly male, although much less so than in the past. Nursing and elementary school teaching remain predominantly female. The "male" jobs tend to be more highly paid than the "female" jobs. Second, within the same employment areas, females tend to be less well paid than males.

The most carefully systematic study of schooling, occupation and earnings is that by Sewell and Hauser (1975). However, this study has a major limitation. It is based essentially on a longitudinal study of white, nonfarm males from Wisconsin. However, the gender bias is common to most longitudinal research in this area for the simple reason that males have, until very recently, been predominant in the labour force. Indeed, children's social class has predominantly been identified with father's education, employment and income.

An important question addressed by Sewell and Hauser is that of the conduit. If schools are principally a conduit for the succession of caste from generation to generation one might assume that social class would be the most important predictor of sons' success, with intelligence held constant. In contrast, the greater the independent effect of measured intelligence, with social class held constant, the less the school would appear to be a conduit. Sewell and Hauser's conclusions are cautiously positive, i.e., measured intelligence has a strong net effect on educational attainment (0.366), which in turn has a strong effect on occupation (0.544), which in turn has a rather weaker effect on earnings (0.129). The effect of parents is largely to influence the sons' intelligence, through some combination of genetic inheritance and upbringing. Jencks et al. (1972 and 1979) reach similar statistical conclusions but the interpretation is much less positive. If intelligence is interpreted as being largely cultural rather than genetic in origin, then the school remains a conduit which filters fortunate children of intelligent, caring parents from the unfortunate. Furthermore, the final conduit problem remains. Let us assume that intelligent children from a variety of home backgrounds receive credentials leading to material success in future life. To what extent do the credentials reflect attributes acquired in school (attributes which may be intellectual or attitudinal), and to what extent do they reflect attributes produced outside the school and merely certified by the school? Is it the mathematics, the physics, the good work habits, the problem solving skills, writing skills learned in school that contribute to success in university and in later life? Or is it general character traits and quickness of

thinking acquired outside school? Research does not clearly address this question and good research would be difficult although not necessarily impossible to design.

No comparably thorough studies have been carried out in Canada. The closest equivalent is that by Porter, Porter and Blishen (1982). Their assumptions are similar to those of Sewell and Hauser. Implicit is the idea that intelligence should predict future success independent of social status. A major finding, as I have already noted, is that females were greatly disadvantaged in Ontario fifteen years ago. That is to say, intelligent females of low social status were even less likely than comparable males to develop the high academic aspirations necessary for future economic success. The Clark and Zsigmond data suggest that there has been some change, women are as likely as men to attend university, but their choice of program remains different from that of men.

In short, the simple question can be answered easily enough: schooling is a very good predictor of future employment and earnings. The factors underlying that relationship are much less easily understood.

Does success in university predict career success?--The superficial question has already been answered. One does not become a teacher without access to postsecondary schooling. Postsecondary credentials are required increasingly for a wide range of jobs. Moreover, there is a clear relationship between amount of schooling and type of schooling and future income.

A more difficult question is whether better grades in university predict more success in later life. At first sight, these findings are surprising--they apparently contradict the propositions I have just put forward. Cohen (1984) conducted a metanalysis and concurred with Hoyt's earlier study (1965) that, in general, the level of relationship between grade point average in university and success in later life is extremely low. The correlation coefficients are: job performance assessed by superior 0.2, by peers 0.16 and by self 0.09; income 0.12; promotion 0.16; eminence 0.14; and graduate degree 0.16. Cohen states that for such a relationship to be perceptible to employees and employers the coefficient would have to exceed 0.3.

These findings reflect the public's lesser concern about performance in the university than about performance in school. A medical student passing at the bottom of the class still

becomes a certified physician--and few patients ask to see a university transcript. In contrast, the futures of students at the bottom of the ninth grade class are starkly different in prospects from those at the top. The same point can be made statistically. The range of students within a university program is comparatively small. Not only that, but the student who is abnormally unintelligent (the student in medical school, for example, with an IQ of 100) is compensating for the intellectual deficit with other characteristics--possibly conscientiousness, effort, seriousness, good work habits and determination. The smaller the variation in those being differentiated, the greater difficulty in prediction. Coppedge (1969) had come to similar conclusions. He followed graduates from a single high school and found that school test scores predicted college achievement well, but found no relationship between college scores and future occupational success.

What is generally true appears to be equally true within particular occupational settings. That is to say, good grades in dental school, law school, medical school and engineering have little relationship to future success. Muchinsky and Hoyt (1973) conclude that employers of engineering graduates should consider grade point average an irrelevant variable; however, they do not indicate which variables they would consider relevant. They also conclude with what becomes a refrain in this review of the literature -the best predictors of future behaviour are measures of similar past behaviour.

One should be careful not to overinterpret these findings. It would be easy and perhaps facile to conclude that top university students are no different from bottom university students. That may be true, but it does not follow from the research I have described. The criteria of success in life are enormously varied--money, power, esteem, self-esteem, life style, happiness, job satisfaction. None of these correlates very strongly with grades, but nearly all are significantly related to them. It is possible that different individuals have very different ambitions, i.e., very different criteria of success. If good students randomly choose among the criteria, and if the various criteria are not strongly interrelated, then one would not expect there to be a strong relationship between grades and any particular criterion of success. This would be true even if every single good student was more successful, according to his or her own particular criterion, than every poor student. That is to say, the good student whose ambition is high job satisfaction may in fact achieve very high job satisfaction--and not much money or power. If that possibility is combined with the low reliability of some measures of success and the small amount of variation in the skills of

graduating students as compared with nongraduating students, then the low relationship is quite unsurprising. Further, a medical faculty might boast of the lack of relationship, arguing that all graduates in that particular faculty were brought to a very high level of competence--hence future success would be a matter of interest, commitment and choice.

Lin's finding (1977) that the relationship between undergraduate and graduate performance is slight can be used either to support or refute the interpretation I have just provided. There is little variance in graduate grades, perhaps reflecting homogeneity among graduate students. Prediction of success is difficult when the population is homogeneous. If different people select very different criteria of success, perhaps even graduate students, and undergraduate students, also select different criteria. Enjoyment of learning, prospective employment and a happy life, as well as good grades, may be criteria selected by graduate students. In that case, success as an undergraduate, in terms of grades, may conceivably predict success, defined variously, among graduate students. More likely, however, to the extent that Lin's finding is valid, the difference in undergraduate grades of qualified graduate students does not explain very substantially their varying success. However, the measurement problems must not be underestimated. The reliability and validity of assorted undergraduate and graduate grades are unlikely to be high. In this case, one would expect prediction to become easier if there are fewer measurement instruments and greater agreement on the criteria.

A further metanalysis was carried out by Samson (1984) who distinguishes occupations such as nursing, business, the armed forces and civil service from occupations such as teaching, engineering and medicine. In the former set, prediction is easier, particularly in the case of compact subsets with the same employer. Even here, no coefficient exceeds 0.3, but he does report findings between 0.2 and 0.3--with salary being the most easily predicted criterion, and university grade point average being slightly superior to high school average as a predictor. There is, therefore, some faint support for the hypothesis that part of the lack of relationship between university success and success in employment is a measurement problem. In those occupations where there is agreement on what constitutes success, as there tends to be in the armed forces and in business but not in teaching and medicine, prediction is easier.

The two major findings are not contradictory. In general, more schooling is strongly related to measures of success in future life. There are gender differences. There are differences between employment sectors. Thus, for example, people with less schooling in technical fields tend to earn more money than people with more schooling in the arts. But the overall relationship is clear. Within a particular employment category, relative success in university is not a strong predictor of future success in life. There are numerous possible explanations for this finding. They include: the small amount of variance among students in a small sector; measurement problems; the small amount of interrelationship among different criteria of success; and the different criteria of success possibly selected by different people.

Does schooling increase wealth? Is there a sound return on investment in schooling? --Research on these questions has gone through several phases. In the early post World War II days of optimism, it was generally assumed that the development of "human capital" leads easily and directly to economic development. It was also assumed that the economic development of the U.S.A. could be replicated easily elsewhere given sufficient educational investment and that the economic problems of the European colonial empires would be solved by more schooling. Later, some economists began to believe that many nations were overinvesting in schooling, to the detriment of a basic, industrial infrastructure. The essential relationship between schooling and economic development remains unchallenged. There are no economically developed countries without highly developed systems of schooling. There are no countries with highly developed systems of schooling that remain undeveloped.

As has been noted earlier in this report, fundamental questions remain about the nature of the relationship. Does schooling create economic development (as seems to be at least partially the case in Sweden, Switzerland, West Germany, Japan and Singapore)? Does the development of economic wealth provide the ability to develop patterns of schooling (as seems to be at least partially the case in Saudia Arabia, Kuwait, Nigeria and South Africa)? Or does human will determine the simultaneous development of both schooling and industry (as seems to be at least partially the case in Singapore, Taiwan, South Korea, Cuba and Hungary)?

McClelland (1969) writing twenty years ago concluded optimistically that there is a high economic return on educational investment. The subsequent analyses have been more cautious. Michael (1975) suggests three conceptual ways in which education may increase individual

earnings--and perhaps economic development. First, it may increase individual productivity. Second, it may provide a good screening device, in terms of legitimate, meaningful credentials. Third, it may provide a bargaining device to increase income. If the first explanation is valid, both the individual and society benefit. If the second explanation is valid, once again there is both individual and societal gain, although a portion of the gain is zero-sum. A qualified person gets the job instead of an unqualified person. That may not always be advantageous even when credentials are genuine. If the third explanation is valid, the situation becomes much more complex. It is this situation that often goes by the name "credentialism." Credentialism with a negative connotation implies that the credential is empty and functionally irrelevant. For example, five years of training rather than four is unlikely to be related functionally to improved outcomes from teaching at the elementary level. Truck drivers are unlikely to be more competent as an outcome of their twelfth year of schooling. Neither of these statements denies the possibility that prospective teachers who select five years of training may do better than those who select four, or that high school graduates are better drivers than high school dropouts. The point is merely that the same person with four years of university training is likely to be equally good as that person with five years of university training in the elementary classroom. Credentialism implies a change in the zero-sum game. Longer training usually implies higher salaries--so teachers with seventeen years of schooling tend to be more highly paid (i.e., receive a higher proportion of the country's gross national product) than do teachers with fourteen years of schooling. Credentialism may also have a negative additive effect. Thus, if a country provides expensive and unnecessary schooling for seventeen years when fourteen years would do, it is possible that resources are being diverted from more productive to less productive undertakings (i.e., societal productivity is being reduced). Now it is an open and contentious political question whether there is a long term stimulative effect from increased governmental spending, and one which I shall not enter here. The point is that, conceptually, it is understandable that increased schooling may augment both the individual's and the nation's economy or that it may, in some circumstances, lead to reduced productivity. If workers are made more productive, more efficient and more effective, there may be gains. If limited resources are spent for unproductive purposes, or less productive purposes than some other alternatives, there may be loss.

There is some evidence, Grasso (1977), Burkheimer and Novak (1981), Goyder (1980), that the individual return on schooling in both the U.S.A. and Canada is declining. If this is so,

a possible reason is that schooling has so expanded as to provide a supply of schooled individuals greater than the demand. To the extent that that the laissez-faire system operates, that imbalance translates into a lower financial premium for advanced education. To the extent that credentialism protects certain occupations (e.g., law, medicine, education), the resulting distortion may not translate into a lesser return for individuals, but will lead to a lesser return for society. In Canada,the supply of schooled individuals is not as great as in the U.S.A. However, the effect of "credentialism" may well be greater in this country as the proportion of unionized workers is higher.

Advanced schooling is a necessary condition for economic development but it is never a sufficient condition or an automatic cause. Moreover, it is quite possible that increased schooling developed in terms of illegitimate credentials will not only distort the workings of the labour market but will reduce a society's economic growth. It does not follow that such distortions are unjustifiable. If the academic, aesthetic, moral and physical benefits of increased schooling are sufficiently great to offset possible economic costs, the increased schooling may well be justified. In an analagous way, increased costs for extending the lives of the old, though they divert spending from other more economically productive pursuits, may be justified in terms of the moral and physical gains.

(4) The Physical Domain

Does schooling increase society's and individual's physical fitness?--This appears to be a clear case where societal and individual benefits are merged. Improved fitness and understanding of health is beneficial to both the individual and society. The gain of one individual is only very rarely linked to the loss of another.

However, this outcome of schooling is consistently neglected in the literature. I have been unable to find a single study attempting to link experience in school with outcomes in later life, even if one considers the use of intervening variables such as fitness at time of high school graduation.

It can only be assumed that there is little interest in school effects on fitness. This assumption is consistent with the way in which physical fitness is often treated in most educational jurisdictions in the western world. Physical education is usually optional during

the important adolescent years. One can only presume that those who are least fit do not enrol in physical education programs, just as those who are poorest in science do not enrol in science programs. Hence, any beneficial effect there may be, is unlikely to be experienced by those most in need.

One explanation for the comparative neglect of physical fitness is that the public is uninterested in physical fitness. An alternative explanation is that the public does not believe schools have or should have or can have much effect. In contrast, whether or not the belief is valid, the public perhaps believes the potential effect of the school in the academic and aesthetic domains is greater. The public is rightly aware of one thing, schooling is strongly related to success in the social domain. There is, of course, considerable research looking at the effect of specific programs on student fitness just as there is research looking at student learning from a variety of subjects. But that lies outside the realm of this survey.

(5) The Moral Domain

Does schooling affect the future moral lives of young people?--This domain is a distant third, after the academic and social domains, in the prominence of the treatment received by educational researchers. At the school level, most of the research has examined children's moral and attitudinal growth, with little attempt being made to distinguish the effect of the school from that of the home. Moreover, when school effects have been more carefully examined it has usually been as intervening variables important for the effect they may have on the academic domain. Coleman (1966), for example, looked at such variables as self-concept of ability and sense of control of one's environment. Neither was considered important in its own right. They were assessed in terms of their possible effects on academic achievement.

Durkheim (1961) argued persuasively that schools do provide a powerful moral framework within which children learn to make sense of their lives. Dreeben (1968) specified four moral norms that are learned in western schools and applied later in life, namely: universalism, specificity, achievement and independence. Numerous writers, from the left to the right, have accused schools of having a subversive effect, either by brainwashing children for a world dominated by capitalists, or by inciting them to rebel against their parents and other legitimate authorities. However, there is little empirical evidence to support either view,

although one may assume, with Dreeben, that schools, at least to some extent, mirror the societies in which they are found.

Bronfenbrenner (1970) argues, based on case study reports of schooling in the U.S.S.R. and the U.S.A. that the Soviet Union is very effective in teaching the moral norms underlying communism, while western society is much less successful in teaching the values and virtues which characterize the best of western society. The apparent reason for Soviet success is consistency among government, the home and the school, and the precision and purposefulness with which the stated goals are pursued. Bronfenbrenner fails to acknowledge clearly the advantages of schooling in a totalitarian society, i.e., it is much easier to reach consensus where there is no democratic right to disagree. In contrast, western society tends to be diffident and confused about its values.

Bronfenbrenner's argument is consistent with case studies at both the school and postsecondary levels. Weinberg (1967) in a study of Winchester, a private boarding school in England, demonstrates how norms stabilize tradition and how the abundance of rules, the regularity of daily routine and the mortification of those of inferior status force unity and uniformity within the collectivity. The intense pressures of the closed system invite compliance or rebellion, and the majority, as in the Soviet Union, complies. The ideas are supported by Wilkinson's earlier study of the function of the prefect system in a similar private boarding school (1964).

It is not only authoritarian influences that appear to be most effectively inculcated within a powerful environment. Heath (1976) reached a similar conclusion from a study of Haverford College, a Quaker college generally considered to be particularly effective in the moral domain. In a longitudinal follow-up of graduates, it was found that Haverford was seen to be quite effective in bringing about the integration of moral and intellectual excellence. Even so, Haverford College ranked ninth among perceived influences determining maturing during postcollege life. It ranked behind wife, occupation, role as husband, occupational way of life, occupational way of life of associates, atmosphere in the home, graduate and professional school and sexual relationships.

Longitudinal studies of college experience tend to show powerful short term effects from small, residential elite colleges, but decreasing or even reversing trends over time. Kuh

(1976) found a persistent orientation to intellectualism five years after college in a broad sample but also found a decreasing tolerance for ambiguity, less sense of autonomy and increased materialism.

Jacob (1957) in a careful review of previous research argues that the often noted liberalizing effect of college is merely a reflection of the dominance of liberal ideas in those times. In fact, college students change much more than noncollege students, becoming more sophisticated and socialized to new norms. However, one must accept the possibility that college students are, by nature, more open than noncollege students to change. Indeed they may be seeking change.

Freedman (1967) also refers to the sophistication that takes place among Vassar students. There, the women become more dominant, autonomous, exhibitionistic and more interested in sex and change. He writes, with unconscious bias, "perhaps the most valuable way in which educators can contribute to the development of college students at this time is to reinforce their openness and readiness to change", p. 36. Within five years of leaving, in contrast to some other studies, Freedman found little change in attitudes and values.

Feldman and Newcomb (1969) conclude that the impact of college depends on the goodness of fit. If students get what they are looking for, the changes can be considerable within the appropriate environment. In small liberal arts colleges, students may become less traditionally religious, more relativistic, more liberal and less dogmatic. Thus the effect of Vassar may be the more intense because of the intensity of the experience and the uniformity of the student body.

The dilemma of the moral domain becomes apparent. It appears that school and university may have an effect on students. The effect will be greatest when: students' backgrounds fit the values to be inculcated; the influence from peers and teachers is consistent; the values to be taught are clear and unambiguous; there are powerful environmental reinforcements. Even in these cases, the effects are susceptible to experiences after school or university--to the influence of major events such as marriage and employment. The dilemma becomes insoluble. If society has a clear set of values, the schools will reflect them. If society lacks consensual values, then a clear, unwavering sense of purpose is difficult to achieve. In the latter case, liberal schools and colleges are likely to influence liberal young people and

conservative schools and colleges are likely to influence conservative young people. For the masses who attend schools and universities with diverse and conflicting sets of values and beliefs, no change seems very likely.

CONCLUSION

The Five Domains

Success in life can be divided into five major domains--the academic, the aesthetic, the social, the physical and the moral. All can be seen in terms of individual success and societal success. In practice, most research dwells on success defined in individual terms, partly because we live in individualistic times and partly because society is often seen as the sum of its individuals.

Most research dwells on success defined in quite narrow terms. The criteria are school and university grades and future employment and income. Furthermore, the research emphasizes the zero-sum model more than the additive model. The materialistic nature of our society is reflected in the emphasis on schooling for social mobility, for the distribution of young people among a variety of jobs, and for achievement in the chosen field of work. There is little research on whether schooling helps people live a good life. Even the research on the differences among schools which make them more or less effective is often based on the assumption that academic achievement (which we have seen is, in effect, an intervening variable between background factors and future social status) is the only important variable.

In a meritocratic and materialistic society, it is not unreasonable that we should be concerned about the fair distribution of societal material goods, both for individual justice and for the general welfare of society. This area of study is well researched, although less so in Canada. Further, we are still far from understanding the processes differentiating more from less effective schools, even within the highly studied academic area. Many of the most important questions in the areas must be addressed in terms of underlying values rather than in terms of case studies or empirical surveys. How much equality of outcomes between men and women, among different races, among different cultural groups, do we want? Do we want

proportionately equal numbers of physicians to be male and female, black, white and yellow, Jewish, atheist and protestant? If so, are we willing to accept the required quota system and individual regulation? Do we want learning outcomes to be more equal? If so, are we prepared to mandate mastery learning and face the objections from parents of gifted children? Do we want to make it more difficult for individuals to inherit social advantages from their parents? If so, are we prepared to mandate a single state school system, and to extend compulsory schooling to a younger age? Are we prepared to act to reduce cultural differences among different ethnic groups? Do we want an equal or a multicultural society?

Important as these concerns are, it is unfortunate that so little attention has been given, particularly in Canada, to the other domains. Very little research is being carried out on the long term intellectual effects of schooling. In aesthetic areas, we are almost totally ignorant of the ways in which some people become aesthetically sensitive and expressive, while others remain undiscriminating and, at best, passive observers. In the physical domain, it is generally assumed that regular physical exercise and good nutritional habits are good things--but research on the school's effects are lacking. In the moral domain, Canadian research is almost totally lacking.

Possible Future Research

I have previously developed a conceptual map of the territory which I shall not repeat here. Instead, I shall select certain areas of research in which Canada could make an important contribution.

(1) Longitudinal Research. The most ambitious contribution would be the development of a study of a cohort of students, beginning in first grade. The cohort would be exhaustively studied in terms of home background, intellectual and physical abilities, cultural environment and schooling. With a follow-up every three years it would be possible to trace the development of children in the five domains. The research would involve four techniques: questionnaires, testing, case studies and individual interviews. As well as a large province-wide random sample, selected samples would be taken from particular schools, differentiated by various characteristics thought to be influential.

(2) Long Term Effect of Schools. A large scale empirical study of adults aged 40, 50, 60 and 70 might be carried out. Comparisons would be made among samples with various levels of schooling. Questionnaires and short tests would examine values, attitudes, general knowledge, cultural knowledge and physical participation.

A more easily carried out, and perhaps more valuable version of the same inquiry would use a much smaller number of subjects (perhaps 50) who would be subjected to a series of lengthy, probing interviews. The purpose would be to have them reflect on their lives and the influences within them. The interviews would be focused on the five domains of success.

(3) School Effects Canada lacks any large scale study of school effects. It is unknown to what extent findings in other countries are broadly operative in Canada. It would be particularly valuable if a study of such effects could be broadened to the domains not usually studied. Case studies would be valuable as well as large scale empirical studies.

(4) The Physical, Moral and Aesthetic Domains. As Canadian research in these domains is almost entirely lacking, research into the lives of high school and university graduates immediately after and five years after graduation would be valuable. Initially, the use of questionnaires and a small number of follow-up interviews will provide basic data from which more intensive and systematic research might develop.

(5) Experimental Studies. In many cases, a large scale search for effects would be of little value. There is little point in looking intensively for what almost certainly does not exist. Research on short term effects of various kinds of moral, physical and aesthetic education is badly needed. Short term effects do not always translate into long term effects. But experimental studies designed to see if it is possible to bring about an effect in these areas would be useful.

(6) Reverse Case Studies. A technique used only rarely is to identify those who are successful in the various domains and to study their lives and schooling retrospectively. This could be a variant of the second example given above.

(7) Case Studies. Both individual and institutional case studies may shed important insights on the processes implied in developing success. They are useful complements of empirical studies.

I have suggested that the weakness in the research is its overemphasis on the social domain, with the individual as unit of analysis, based on zero-sum assumptions. There is, in addition, abundant research, outside the scope of this study, on pedagogical and administrative methods. Such research is nearly always concerned with short term outcomes. What is really lacking in educational research is a long term perspective, whereby we view our work in schools and postsecondary institutions in terms of their long term chances of improving individuals and society.

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